DEVELOPMENT OF MATHEMATICS LEARNING TOOLS USING THE HORAY COURSE REVIEW TYPE COOPERATIVE MODEL (CRH) IN MATERIAL COMPOSITION AND INVERSE FUNCTIONS

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Abstract. This study aimed to produce learning tools based on a valid CRH type of cooperative learning model. The learning tools developed are in the form of a Learning Implementation Plan (RPP) and Student Worksheets (LKPD). The development model used in this research is the Plomp model, which is modified into four stages, namely: (1) Initial investigation, (2) Design, (3) Realization/construction, (4) Test, evaluation, and revision. The data analysis technique used is descriptive statistical analysis. From the research results, the average total validation of the RPP is 88.67%, with very valid criteria. This means that the RPP made by the researcher is suitable for use or trial. Then, the average total validation of LKPD is 84.98%, with quite valid criteria. This means that the LKPD made by the researcher is feasible to use but requires a small revision. Based on the results of these studies, it can be concluded that the development of learning tools based on the CRH type cooperative model on the material of compositional and inverse functions whose validity has been tested is feasible to use.

Keywords: Learning Media, Course Review Horay (CRH), Lesson plan (RPP), and Student Worksheet (LKPD).

1. INTRODUCTION

The thing that must be changed to be able to build an advanced Indonesian nation is to improve the education system in Indonesia. Education is the process of bringing about desired changes in human behavior. Education is also defined as habits through learning or study and a process of acquiring knowledge. Creating intelligent nation's children is also included in the characteristics of national education goals [1].

From year to year education in Indonesia uses the curriculum and at this time Indonesia uses the 2013 curriculum which has learning characteristics using a scientific approach. This is stated in Permendikbud Number 65 of 2013 concerning Process Standards which states that it is highly recommended to use an approach so that students can produce contextual work. We cannot be separated from mathematics because there are many applications of mathematics in everyday life. This is supported by the statement that mathematics can be used to solve problems and problems that exist in everyday life [2].

Based on the results of interviews conducted on May 11, 2020 with teachers in the field of mathematics studies regarding the learning tools used by teachers, information was obtained that RPP did not make lesson plans by itself, but teachers only used lesson plans

from teachers who taught previously. Then the researchers saw the weakness of the RPP is that the RPP does not use a scientific approach where the scientific approach is a characteristic of 2013 curriculum learning. This is stated in Permendikbud number 65 of 2013 concerning Process Standards. Meanwhile, for LKPD teachers have not used LKPD even though this LKPD is one of the learning tools that can make it easier for students to understand the material. The importance of LKPD for students is as a tool to build their knowledge, where this LKPD will be prepared by educators [3].

Researchers also interviewed teachers about students. The teacher said that the students' lack of interest in mathematics, so that students quickly forgot the material that had been taught. This is similar to the statement that says:

> The low achievement of students' mathematics learning is caused by several factors including mathematics is one of the lessons that is considered a difficult lesson by students so that students' lack of interest in learning mathematics, many formulas that must be learned and questions that are difficult to understand , thus making the interests and talents of students do not develop in learning mathematics [4].

Then, if the student has a desire to learn, he will quickly understand and remember it [5]. The teacher said that the main factor of the students' lack of interest in learning was the way a teacher taught. This is supported by a statement that says that the teacher's lack of accuracy in the use of methods in learning mathematics can have an impact on students' interest and learning achievement [6]. The teacher also said that students were happier when the teacher used group learning methods, especially groups that were games.

The learning model that is sought to foster student interest in learning is the *Course Review Horay* (CRH). The CRH learning model will be more effective than the expository learning model on student learning outcomes and interests [7]. Based on the description above, researchers are interested in developing learning tools (RPP and LKPD). Learning tools will affect the success of the teaching and learning process in the classroom, because learning tools provide convenience, can assist teachers in preparing and carrying out teaching and learning activities [8].

Based on the background of the problem above, the researcher conducted a research entitled "Development of Mathematics Learning Devices Using Cooperative Learning Model Type Course Review Horay (CRH) on Composition and Inverse Function Materials".

2. RESEARCH METHOD

The type of research used in this research is Research and Development (R&D) with the development model used is the Plomp model which consists of five stages. The five development stages are the initial investigation phase, the design phase, the realization/construction phase, the test, evaluation and revision phase, and the implementation phase.
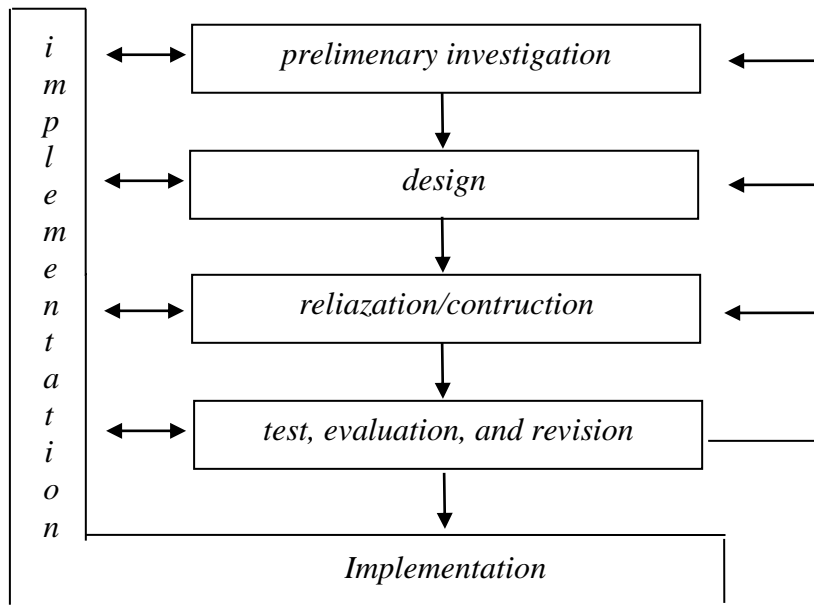
(Source :[9]*)*

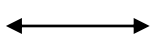**Figure 1.** Plomp Model Phase

Description:
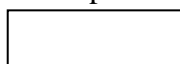
: Development activities

: Development stage activity flow

: The direction of reciprocal activities between the stages of development and implementation ongoing learning models

: Development activity cycle

In this study, the researcher modified which consisted of five phases into four phases, this was due to conditions that did not allow the study to be dropped. The phases in this research are the initial investigation phase, the design phase, the realization/construction phase, the test phase, evaluation, and revision.

Data collection techniques in this study were sourced from experts who are Mathematics Education lecturers and mathematics teachers. In this study there were 4 people who became validators consisting of 2 lecturers from FKIP UIR and 2 mathematics teachers. The criteria for the assessment score in filling out the validation sheet are as follows [10]:

Table 1. Validation Sheet Scoring Scale

Alternative Answer	Score
Very Agree	4
Agree	3
Not Agree	2
Very Not Agree	1

The data analysis technique used in this study is the data that has been obtained will be analyzed descriptively. The formula used in this study is as follows:

$$V = \frac{TS_e}{TS_h} \times 100\%$$

V   : Validity percentage
Ts_e : Total empirical score (sum of scoring scores by validator)
TS_h : Total expected score (maximum total score)

Because there are four experts who validate the learning device so to find out the level of validity it is calculated using the average formula (mean). The final validation formula is as follows:

$$V = \frac{V_1 + V_2 + V_3 + V_4}{3} = \cdots \%$$

Description:
V= Combined validation
V_1= Validation from the 1st expert
V_2= Validation from the 2nd expert
V_3= Validation from the 3rd expert
V_4= Validation from the 4rd expert

After the results of the validity of each validator and the results of the combined validity are obtained, then to determine the criteria for the level of validity, it can be seen in the table below.

Table 2. Criteria for Validity Level

Criteria	Validity Level
85,01% - 100%	Very Valid
70,0% - 85%	Quite Valid
50,01% - 70%	Poor Valid
01,00% - 50%	Not Valid

3. RESULTS AND DISCUSSION

Research Results

Initial Investigation Phase

In this study, the initial investigation to analyze the learning tools was carried out through interviews with teachers in the field of mathematics studies regarding the learning tools used.

Design Phase

At this stage, the researchers designed learning tools in the form of RPP and LKPD as well as research instruments in the form of RPP Validation Sheet and LKPD Validation Sheet.

Realization/Construction Phase

Furthermore, learning tools are made in the form of lesson plans, LKPD and validation instruments.

Test, Evaluation and Revision Phase

At this stage, the researcher validates the learning device that has been made by the researcher. The results of the validation of the RPP and LKPD are as follows:

Table 3. Results of RPP Aspect Analysis

Validated Aspect	RPP Percentage						Average (%)	Validity Level
	1	2	3	4	5	6		
Formulation of Indicators and Learning Objectives	93,72	83,33	93,74	93,75	87,5	87,5	**89,92**	**Very Valid**
Learning materials	86,25	85	87,5	87,5	85	82,5	**85,62**	**Very Valid**
RPP Format	100	100	100	100	100	100	**100**	**Very Valid**
Learning Activities	85,41	85,41	85,41	91,67	91,67	87,5	**87,84**	**Very Valid**
Language	91,67	91,67	91,67	93,75	91,67	93,75	**92,36**	**Very Valid**
Time Allocation	81,25	81,25	81,25	87,5	87,5	81,25	**83,33**	**Quite Valid**
Average							89,84	**Very Valid**

Based on Table 3, it can be seen that aspects of the formulation of indicators and learning objectives, aspects of learning materials, aspects of lesson plans format, aspects of learning activities, and aspects of language are categorized as very valid or feasible to use. In the aspect of time allocation, it is categorized as quite valid. Overall, the results of the aspect analysis on the RPP from the expert validator's assessment are categorized as very valid or suitable for use.

In addition, the researchers also analyzed the validation of the lesson plans from each validator. The following shows the average data on RPP validation from each validator:

Table 4 . RPP Validation Results

RPP	Validity Percentage (%)				Average (%)	Validity Level
	V1	**V2**	**V3**	**V4**		
RPP-1	98,43	76,56	92,18	89,06	89,06	Very Valid
RPP-2	98,43	65,62	93,75	89,06	86,71	Very Valid
RPP-3	100	76,56	89,06	89,06	88,67	Very Valid
RPP-4	100	79,68	95,31	90,62	91,40	Very Valid
RPP-5	100	68,75	96,87	90,62	89,06	Very Valid
RPP-6	100	68,75	89,06	90,62	87,10	Very Valid
Average Total					**88,67**	**Very Valid**

Based on Table 4, it can be seen that the total average in the RPP is categorized as very valid. Thus, the Learning Implementation Plan (RPP) can be said to be feasible to use.

Table 5 . LKPD Aspect Analysis Results

Validated Aspect	Percentage of LKPD						Average (%)	Validity Level
	1	**2**	**3**	**4**	**5**	**6**		
Didactics	81,25	78,12	81,25	81,25	81,25	85,25	**80,73**	**Quite Valid**
Language	87,5	87,5	85,94	89,06	89,06	89,06	**88,02**	**Very Valid**
Material/Content	80	91,25	87,5	91,25	91,25	90	**88,54**	**Very Valid**
Presentation	90	91,25	87,5	91,25	91,25	90	**90,17**	**Very Valid**
Time	81,25	81,25	81,25	81,25	81,25	81,25	**81,25**	**Quite Valid**
Average Total							**85,74**	**Very Valid**

Based on Table 5, it can be seen in the didactic aspect and the time aspect with an average ≤ 85 which is categorized as quite valid or fit for use but requires minor revisions. Then on the aspect of language, the aspect of material/content, and the aspect of presentation that are categorized as very valid or worth using. Overall, the results of the aspect analysis on the LKPD from the expert validator assessment are categorized as very valid or worth using.

In addition, the researcher also analyzed the LKPD validation of each validator. The following shows the average data for LKPD validation from each validator:

Table 6. LKPD Validation Results

RPP	Validity Percentage (%)				Average (%)	Validity Level
	V1	**V2**	**V3**	**V4**		
LKPD-1	100	73,53	85,29	80,88	84,92	Quite Valid
LKPD-2	100	73,53	83,82	79,41	84,19	Quite Valid
LKPD-3	100	73,53	83,82	79,41	84,19	Quite Valid
LKPD-4	100	73,53	89,70	80,88	86,03	Very Valid
LKPD-5	100	73,53	88,23	80,88	85,66	Very Valid
LKPD-6	100	73,53	85,29	80,88	84,92	Quite Valid
Average Total					**84,98**	**Quite Valid**

Based on Table 6, it can be seen that the total average on the Student Worksheet (LKPD) is categorized as quite valid or feasible to use but requires minor revision.

Discussion

Based on the results of the validation analysis by the validator on the aspects of the formulation of indicators and learning objectives. From the first meeting to the sixth meeting, the fourth meeting has the highest score. And the one with the lowest score is the second meeting. This is because the Competency Achievement Indicator (GPA) 3.6.1 is not in accordance with the Basic Competence (KD) 3.6.

In the aspect of learning materials, from the first meeting to the sixth meeting, the third and fourth meetings have the highest scores. And the one with the lowest score is the second meeting. This is because, on the content validation sheet the items presented by the researcher are the suitability of the material with KI and KD.

Furthermore, in the aspect of learning activities from the first meeting to the sixth meeting. This is due to the lack of appropriateness between the cooperative model learning steps and the Course Review Horay (CRH) type. Then in the language aspect, from the first meeting to the sixth meeting, the highest score was 93.75; and obtained the lowest value is 91.67. This is because, there are some parts that use language that is less clear so it is difficult to understand. And the last is the aspect of time allocation from the first meeting to the sixth meeting. This is because, the time stated in the lesson plan is not in accordance with the time used at the vocational school level.

For Student Worksheets (LKPD). In the didactic aspect from the first meeting to the sixth meeting. This is because, the GPA and KD on the LKPD adjust to the GPA and KD in the RPP. Then, in the language aspect from the first meeting to the sixth meeting the lowest score is the third meeting. This is because, in the third LKPD, there are many wrong writings, giving rise to unclear interpretations. As hard as paper should be, definition should be definition.

Then, in the material/content aspect at the first meeting up to the sixth meeting, the lowest score was the first meeting. This is because the material presented in LKPD-1 has not encouraged students to be able to solve problems in their own way. In the presentation aspect from the first meeting to the sixth meeting, the lowest score is the third meeting. This is because, in LKPD-3, the answer for question number 1 provided for answering questions is not enough.

4. CONCLUSION

Based on the research results, it can be concluded that the learning tools in the form of Learning Implementation Plans (RPP) and Student Worksheets (LKPD) with a cooperative learning model of Course Review Horay (CRH) type on compositional and inverse function materials have been tested for validity.

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